

DRAFT STATEMENT OF WORK
for
Remedial Investigation and Feasibility Study
(RI/FS)

ORANGE COUNTY NORTH BASIN



US EPA Region IX
December 2015

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Acronyms

ANSI	American National Standards Institute
ARAR	Applicable or Relevant and Appropriate Requirement
CCR	California Code of Regulations
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CLP	Contract Laboratory Program
COC	Chemical of Concern
CSM	Conceptual Site Model
DCE	Dichloroethene
DQO	Data Quality Objectives
DTSC	California Department of Toxic Substances Control
EPA	U.S. Environmental Protection Agency
FSP	Field Sampling Plan
HSP	Health and Safety Plan
IC	Institutional Control
MCL	Maximum Contaminant Level
NCP	National Contingency Plan
NELAP	National Environmental Laboratory Accreditation Program
OCWD	Orange County Water District
OSHA	Occupational Safety and Health Administration
OSWER	EPA Office of Solid Waste and Emergency Response
OU	Operable Unit
QA/QC	Quality Assurance/ Quality Control
QAPP	Quality Assurance Project Plan
QMP	Quality Management Plan
PCE	Perchloroethene (tetrachloroethene)
RAOs	Remedial Action Objectives
RI/FS	Remedial Investigation/ Feasibility Study
RSL	Regional Screening Levels
RWQCB	Regional Water Quality Control Board, Santa Ana Region
SAP	Sampling and Analysis Plan
SOW	Statement of Work
TBC	To be Considered
TCE	Trichloroethene
TM	Technical Memorandum
VOC	Volatile Organic Compound

**STATEMENT OF WORK FOR
REMEDIAL INVESTIGATION AND FEASIBILITY STUDY
Orange County North Basin**

1. Introduction and General Requirements

1.1. Purpose

This Statement of Work (SOW) describes activities to be performed by Respondent(s) at the Orange County North Basin Study Area (North Basin or Study Area) pursuant to the Settlement Agreement and Administrative Order on Consent, Docket # 2016-03 (Settlement Agreement). The Settlement Agreement requires Respondent(s) to conduct a Remedial Investigation and Feasibility Study (RI/FS) for the Study Area. EPA may use the results of the RI/FS to identify and propose remedial actions needed to address human health or ecological risks.

Respondent(s) shall furnish all necessary and appropriate personnel, materials, and services needed for, or incidental to, performing and completing the work. In the event that EPA enters into the Settlement Agreement with multiple parties, Respondent(s) shall coordinate with all other appropriate parties to jointly conduct the work.

1.2. EPA Oversight and State Review

In accordance with the schedules established in the Settlement Agreement or in this SOW, Respondent(s) shall submit to EPA and the State of California (the State) plans, reports and other deliverables required under the Settlement Agreement, this SOW and the Work Plan required by Section 3.1 of this SOW. All plans, reports and other deliverables will be reviewed and approved or disapproved by EPA pursuant to Section X of the Settlement Agreement (“EPA Approval of Plans and Other Submissions”), except for the Health and Safety Plan (HSP), which will be reviewed by EPA but neither approved nor disapproved.

If EPA disapproves a deliverable and requests modifications, the Respondent(s) shall revise the deliverable and resubmit it to EPA and the State, as provided in Section X of the Settlement Agreement. After receipt of comments from EPA and the State, if any, on a draft document, the Respondent(s) shall submit for EPA and State review a revised document within 14 days of receipt of such comments or within 21 days of receipt of such comments for the RI/FS Work Plan, Sampling & Analysis and Health and Safety Plans for RI fieldwork, RI Report, Groundwater Flow Modeling Plan, Groundwater Flow Modeling Report, Remedial Alternatives Identification and Screening Technical Memorandum (TM), Remedial Alternatives TM, and FS Report, unless specified otherwise in the Settlement Agreement, in Attachment 2 to this SOW, or in writing by EPA.

EPA will review deliverables to assess the likelihood that the work will achieve the requirements set forth in the Settlement Agreement and this SOW. Notwithstanding any action by EPA or the State, the Respondent(s) remain fully responsible for satisfying the provisions and requirements of the Settlement Agreement and this SOW. Nothing in the Settlement Agreement, this SOW, or any other submission shall be deemed to constitute a warranty or representation of any kind by EPA or the State that full performance of the RI and FS will achieve these requirements. The Respondent(s)' compliance with submissions approved by EPA does not foreclose EPA from seeking additional work as provided for in the Settlement Agreement.

1.3 Communication between EPA, Respondent(s), and State Agencies

The primary EPA contact for activities to be conducted pursuant to this SOW is the EPA Project Manager:

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The alternate contact for EPA is:

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The legal contact for EPA is:

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The California Department of Toxic Substances Control (DTSC) contact is:

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Brownfields and Environmental Restoration Program
Department of Toxic Substances Control
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The Santa Ana Regional Water Quality Control Board (RWQCB) contact is:

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Santa Ana Regional Water Quality Control Board
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1.4 Contractor Personnel and Qualifications

As required by Section VIII of the Settlement Agreement, and in accordance with the schedule included as Attachment 2 to this SOW, the Respondent(s) shall notify EPA in writing of the names, titles, and qualifications of the supervising personnel, including contractors to be used in carrying out the Work, and provide a copy of the proposed contractor's Quality Management Plan (QMP). EPA will issue a notice of disapproval or an authorization to proceed regarding hiring of the proposed contractor.

1.5 Reporting to EPA and the State

1.5.1 Monthly Progress Report

Respondent(s) shall prepare and submit written Monthly Progress Reports as required by Section IX of the Settlement Agreement. The progress reports shall, at a minimum: (1) describe the actions that have been taken to comply with the Settlement Agreement during that month, (2) describe Work planned for the next two months with schedules relating such Work to the overall project schedule, (3) describe all problems encountered and any anticipated problems, any actual or anticipated delays, and solutions developed and implemented to address any actual or anticipated problems or delays; (4) describe any modifications that the Respondent(s) have proposed to the EPA or that has been approved by the EPA, and (5) describe any community relations activities completed during the previous month or planned for the next two months. Progress reports are due by the fifteenth day of the following month.

1.5.2 Progress Meetings and Documentation of Critical Decisions

Any critical decisions made in meetings or conversations with EPA representatives shall be documented in a written submittal submitted by the Respondent(s) to EPA and the State within five (5) days of the decision. The submittal shall document the decision and the rationale for the decision.

1.5.3 Reporting During Field Efforts

Respondent(s) shall communicate more frequently when field work is occurring, in accordance with any requirements in the approved Work Plan or any approved Sampling and Analysis Plans (SAPs) submitted in accordance with this SOW.

1.6 EPA Guidance and Reference Materials

Respondent(s) shall complete the Work in accordance with the provisions of the Settlement Agreement, this SOW, CERCLA, the National Contingency Plan (NCP), and EPA guidance, including, but not limited to, the "Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA" (OSWER Directive # 9355.3-01, October 1988 or subsequently issued guidance), "Guidance for Data Usability in Risk Assessment" (OSWER Directive #9285.7-05, October 1990 or subsequently issued guidance), guidance referenced therein, and guidance referenced in Attachment 3 to this SOW.

2. Background

2.1. Orange County North Basin

The Orange County groundwater basin is part of the 360-square-mile coastal plain of Orange County. The Santa Ana River, the primary surface water drainage feature in the area, is located east and southeast of the Study Area. The northern portion of the basin, which includes the cities of Fullerton and Anaheim, falls within the region known as the Forebay, the predominant area of basin recharge. The basin contains two aquifers that are separated by a fine-grained layer at a depth of approximately 200 to 250 feet in some areas.

Orange County Water District (OCWD) is responsible for managing the Orange County groundwater basin that supplies water to more than 20 cities and other water agencies, serving more than two million customers. OCWD has divided the aquifers into three aquifer systems defined by regional aquitards, differences in potentiometric surfaces, and changes in water quality. The shallow aquifer system includes sediments extending to an average depth of approximately 200 feet below ground surface (bgs). The principal aquifer system contains unconsolidated strata extending to an average depth of about 850 feet. The deep aquifer system contains the unconsolidated aquifers below the principal aquifer, extending to an average depth of 1300 feet bgs. Groundwater in these systems generally occurs under unconfined conditions in

the North Basin and under semi-confined to confined conditions further south. The depth to groundwater in the shallow aquifer ranges from approximately 80 to 120 feet bgs. The groundwater flow in the area is from east to west, but flow may change seasonally and over time due to changes in the pumping patterns and the rainy seasons. (DTSC 2011)

Investigations of the Orange County North Basin, the area generally under the cities of Anaheim and Fullerton, have revealed groundwater contamination from volatile organic compounds (VOCs) and other chemicals. From the late 1950s through early 1980s, VOCs were used for industrial activities in this area, such as degreasing in metals and electronics manufacturing. Through these activities, VOCs were released into the environment and impacted the aquifer. A very large multi-source groundwater contamination plume is suspected to have been caused by past and present chemical handling practices in this area. (DTSC 2011) To protect public health due to elevated levels of VOCs, four drinking water production wells impacted by contamination have been shut down and subsequently destroyed: Fullerton well F-FS13 (2002), Fullerton well F-KIM1 (2002), Anaheim well A-23 (2001) and private well BAST-F (2013). High concentrations of perchloroethene (PCE), trichloroethene (TCE), 1,1-dichloroethene (1,1-DCE) and 1,4-dioxane have been detected in monitoring wells in the project area. Other chemicals, including but not limited to 1,2-dichloroethane (1,2-DCA), perchlorate, nitrate, and 1,2,3-trichloropropane, have also been detected in the project area. (DTSC 2011)

The Orange County North Basin is not on the National Priorities List. DTSC completed a site discovery report in February 2011 and petitioned EPA to conduct an investigation in November 2014 (DTSC 2014). Accordingly, in parallel to the RI/FS work, EPA is conducting a Preliminary Assessment and Site Investigation as prescribed by the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) to evaluate whether the Study Area warrants a proposed listing.

2.2. *Regional plume*

The groundwater contamination in the Orange County North Basin underlies an area beneath the cities of Anaheim and Fullerton approximately four miles long and two miles wide. As described by DTSC, the groundwater contamination can be divided into six general areas:

“Within the larger contaminant plume area, it is believed that industrial businesses released hazardous substances, most importantly volatile organic compounds (VOCs), in the shallow aquifer. These facilities are believed to have contributed to the following releases:

Plume 1: This area is bounded by Highland Avenue to the east, Commonwealth to the north, Valencia to the south, and Woods Street to the west. This is the westernmost plume. Fullerton Manufacturing is located towards the eastern boundary of the plume.

Plume 2: This area is bounded to Acacia to the east, Orangethorpe Avenue to the south, Commonwealth to the north, and Harbor Boulevard to the west. This is the largest

plume. The sites that are part of the State's evaluation are CBS/Fender, MAG Aerospace, and Chicago Musical Instruments.

Plume 3: This area is bounded by the 57 Freeway to the east, Kimberly to the south, State College to the west, and Valencia to the north. The sites being evaluated by the State include Aerojet, Alcoa, and Mark VI.

Plume 4: This area is bounded by Walnut Via to the east, Orangethorpe to the south, halfway west between Harbor and Lemon, and Balcom Avenue to the north. The sites being evaluated by the State include Northrop Y-12, Moore Wallace, and Kester Solder.

Plume 5: This area is bounded by Acacia to the east, Orangethorpe to the south, Raymond Avenue to the west, and Kimberly to the north. The sites being evaluated by the state include Arnold Engineering.

Plume 6: This area is bounded by Acacia to the west, State College to the east, Kimberly to the north, halfway south between Orangethorpe and the 91 freeway. The sites being evaluated by the State include Crucible Material." (DTSC 2014)

The RI/FS will expand upon this preliminary delineation to more explicitly define the nature and extent of contamination in these, and potentially other, areas. The RI/FS will also evaluate the extent to which shallow contamination has migrated or could migrate deeper into the principal aquifer. The RI/FS for the North Basin shall assess the need to, and identify methods that might be employed to, satisfy the following preliminary remedial objectives:

- Hydraulically contain groundwater where contaminant concentrations exceed Maximum Contaminant Levels (MCLs), or alternate delineation criteria for containment, to protect water supply wells and groundwater resources threatened by the spread of contaminated groundwater.
- Remove contaminants from groundwater until concentrations of COCs in the aquifer are below State and Federal MCLs, or an alternate standard for chemicals without a MCL, or demonstrate why aquifer restoration is not feasible in the timeframe in which other productive actions might be undertaken.

2.3. Source areas

The project area was previously used for agricultural purposes from about 1920 to 1954. Since that time, industrial activity has increased, and numerous industrial facilities in the area have contributed to groundwater contamination. The RWQCB and DTSC identified several sites potentially responsible for groundwater contamination in the North Basin. The RWQCB is overseeing cleanup at six sites, namely AC Products (172 East La Jolla St. Placentia); Aerojet (601 South Placentia, Fullerton); Alcoa Plant 1 (800 S. State College Blvd., Anaheim); Monitor Plating (800 East Orangefair Lane, Anaheim); Northrop Kester Solder (1730 North

Orangethorpe Park, Anaheim); and Northrop Y-12 (301 E. Orangethorpe Ave., Anaheim). An additional six sites are being addressed under DTSC oversight. Three of the DTSC sites have active parties, namely Corru-Kraft/Former Saint Heart Container (1901 & 1911 East Rosslyn Ave., Fullerton); Northrop ESO/EMD Electronic Division (500 E. Orangethorpe Ave., Anaheim); and former Reliance Plating (1151 E. Ash Street, Fullerton). Three of the DTSC sites are being cleaned up by the State as orphan sites, specifically Chicago Musical Instruments (350 S. Raymond Ave., Fullerton); Orange County Metal Processing (1711 East Kimberly Ave., Fullerton); and PCA Metal Finishing (1726 East Roslyn Ave., Fullerton). Additionally, the Orange County Health Care Agency has overseen work at some sites.

As delineated in EPA's September 2015 letter to both State agencies, EPA expects that the State will continue the investigatory and remedial work during the RI/FS process. The RI/FS for the source areas will assess the need to, and identify methods that might be employed to, satisfy the following remedial objectives:

- Prevent direct contact with contaminated soils or groundwater presenting an unacceptable human health or ecological health risk,
- Eliminate unacceptable risks to human health caused by the intrusion of volatile subsurface contaminants into the indoor air of overlying buildings (i.e., vapor intrusion),
- Reduce contaminant movement from the soil and soil vapor to the groundwater where remediation would significantly reduce contaminant loading to groundwater.

These sources must be identified and characterized to an extent sufficient to evaluate the current status of cleanup. Some cleanup efforts may need to be expanded or optimized, and some areas that are not currently undergoing remediation may require it to achieve the objectives above.

3. List of Deliverables and Other Tasks

Respondent(s) shall plan and conduct an RI/FS for the Study Area in accordance with relevant EPA regulations and guidance, some of which are referenced in Attachment 3. The RI/FS shall, among other things, adequately characterize the sources, nature, extent, and movement of contamination; include any needed field investigation; identify applicable or relevant and appropriate requirements (ARARs); assess potential risks to human health and the environment and, if necessary, develop, screen, and evaluate remedial action alternatives.

Respondent(s) shall submit plans, reports, and other deliverables for EPA and State review. This SOW requires written submittals describing the results of the baseline risk assessment, identifying ARARs, describing the development and screening of remedial alternatives, evaluating the need for response actions at source areas, and providing the results of the detailed evaluation of remedial alternatives, as well as a RI Report and a FS Report. Major deliverables

are specified in Attachment 2. Pursuant to Section X of the Settlement Agreement, EPA may approve, disapprove, require modifications of, or modify each deliverable.

Respondent(s) shall implement quality control procedures to ensure the quality of all reports and submittals to EPA and the State. These procedures shall include, but are not limited to, internal technical and editorial review; and documentation of all reviews, problems identified, and corrective actions taken.

3.1. Remedial Investigation/Feasibility Study Work Plan

Respondent(s) shall submit a draft RI/FS Work Plan (hereafter “Work Plan”) for EPA and State review and approval in accordance with Section IX of the Settlement Agreement and relevant EPA guidance. The Work Plan shall describe the tasks required to complete the RI/FS, the methodologies to be used, information to be produced during and at the conclusion of each task, a description of the work products that will be submitted to EPA, and a schedule for their completion. Respondent(s) may request to meet with EPA and the State prior to submission of the Work Plan to clarify any questions regarding the Statement of Work.

Respondent(s) shall submit a Revised RI/FS Work Plan, if directed by EPA. Upon approval by EPA, Respondent(s) shall implement the Work Plan. Upon its approval by EPA pursuant to Section X of the Settlement Agreement, the Work Plan (and other plans, reports, and deliverables submitted to EPA under the Settlement Agreement) shall be incorporated into and become enforceable under the Settlement Agreement. The Work Plan shall include the elements described in Sections 3.1.1 through 3.1.15 of this SOW.

3.1.1. Study Area Description and Conceptual Site Model (CSM)

The Work Plan shall include a brief description of the Study Area, including the suspected sources, nature, and extent of soil and groundwater contamination; and geographic, hydrogeologic, ecological, cultural, or natural resource features relevant to the RI/FS.

The Work Plan shall also provide an initial conceptual site model (CSM) for the entire site, including detail on specific sources as appropriate, along with provisions for updating the CSM when appropriate based on the availability of new information.

3.1.2. Data Management

The Work Plan shall describe how water level, water quality, and other data to be compiled during the RI/FS will be managed. Unless otherwise indicated, data shall be submitted to EPA and the State in electronic format. When necessary due to file size, Respondent(s) shall provide an acceptable file transfer mechanism for the submission of

large documents.

3.1.3. RI Activities

The Work Plan shall describe previous findings relevant to the Study Area, and field activities needed to complete the RI/FS. The Work Plan shall include provisions for submittal of one or more SAPs that will generate data needed to satisfy the following objectives:

- Refine the CSM and fill data gaps;
- Prepare baseline risk assessments for human health and ecological receptors;
- Support the development and evaluation of remedial action alternatives for the North Basin;
- Provide any other data needed to complete the RI/FS; and,
- Provide data to address any concerns about the quantity, quality, completeness, or usability of water quality or other data that will be used in the RI/FS.

The RI investigation shall include, at a minimum:

- Review of existing data developed by EPA, RWQCB, DTSC, OCWD, private companies, and other local entities;
- Creation of a list of chemicals of concern (COCs), likely including but not limited to perchloroethene (PCE), trichloroethene (TCE), 1,1-dichloroethene (1,1-DCE) and 1,4-dioxane;
- Evaluation of the sources of contamination;
- Construction and sampling of new groundwater monitoring wells to define groundwater flow directions and the nature and extent of contamination, including the leading edge of contamination; and,
- Measurements of groundwater elevations and collection and analysis of groundwater samples for possible COCs from new and selected existing groundwater wells. The Work Plan shall propose initial sampling frequencies by well and COC, and provide for modifying those frequencies as the investigation progresses.

EPA has identified potential data gaps in the currently available information, including the potential locations of new wells needed to achieve the above-stated goals. Tables 1 and 2 and Figures 2 and 3 of Attachment 1 are intended to assist in preparation of the Work Plan, but the recommendations are neither final, prescriptive, nor exhaustive.

The RI shall include, if necessary, additional field work and/or analysis to:

- Evaluate the potential for vapor intrusion, where volatile contaminants migrate into the indoor air of buildings above or nearby contaminated soils and

groundwater. EPA has tentatively identified areas where further investigation of the potential for vapor intrusion may be required to assist in preparation of the Work Plan. The list, presented in Table 4 and Figure 4 of Attachment 1, is neither final nor exhaustive. All vapor intrusion investigations should follow EPA's June 2015 guidance "Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air," OSWER Publication 9200.2-154.

As described in more detail in Section 4 of this SOW, the SAP shall describe planning, field, laboratory, data review and interpretation, and reporting efforts needed to satisfy the RI objectives.

3.1.4. Technical Reports

The Work Plan shall include provisions for the preparation and submittal to EPA of one or more technical reports that summarize the results of RI field activities. If appropriate, the reports shall update figures showing water level contours and/or the nature and extent of soil or groundwater contamination in plan view and/or vertical cross section, update the CSM, and make recommendations for any additional RI work needed to complete the RI/FS.

3.1.5. Groundwater Flow Modeling

The Work Plan shall include provisions for the use of a numeric groundwater flow model to better understand groundwater movement in the Study Area, support the placement of groundwater monitoring wells and complete other field activities, and/or evaluate remedial alternatives. The Work Plan shall include provisions for submittal to EPA of a Groundwater Flow Modeling Plan, preliminary modeling results, and a Groundwater Flow Modeling Report at the completion of each discrete modeling effort.

The model shall be calibrated over a wide-range of hydrogeological conditions and have the capability to simulate transient conditions in three dimensions. The model shall be capable of conducting particle tracking simulations to evaluate hydraulic control. The modeling effort shall include a sensitivity analysis. The modeling effort should consider the procedures outlined in EPA's guidance document "A Systematic Approach for Evaluation of Capture Zones at Pump and Treat Systems, EPA/600/R-08/003, January 2008."

3.1.6. Risk Assessment

The Work Plan shall include provisions for the preparation and submittal of a Technical Memorandum (TM) that presents the results of a Baseline Human Health Risk Assessment for the Study Area. The risk assessment shall be conducted in accordance with applicable EPA and State guidance, including but not limited to "Interim Final Risk

Assessment Guidance for Superfund, Volume I - Human Health Evaluation Manual (Part A),” (RAGS, EPA-540-1-89-002, OSWER Directive 9285.7-01A, December 1989); and “Interim Final Risk Assessment Guidance for Superfund, Volume I - Human Health Evaluation Manual (Part D, Standardized Planning, Reporting, and Review of Superfund Risk Assessments),” (RAGS, EPA 540-R-97-033, OSWER Directive 9285.7-01D, January 1998).

The risk assessment shall address all pathways of exposures that pose an actual or potential risk to human health and the environment (e.g., human consumption, dermal contact, inhalation) and should evaluate the potential for contaminated soil, soil vapor, or groundwater to serve as a source of contamination to other media (e.g., for vapor intrusion into buildings). The risk assessment shall also consider cumulative exposure where multiple contaminants are present.

The Work Plan shall include provisions for the preparation and submittal of an Ecological Risk TM that presents the results of an ecological risk assessment for the Study Area in accordance with applicable EPA guidance, including “Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments” (ERAGS, EPA-540-R-97-006, OSWER Directive 9285.7-25, June 1997). The first step of the risk assessment shall be a determination as to whether there are potentially complete exposure pathways for ecological receptors. If no potentially complete exposure pathways exist, then the ecological risk assessment shall be complete upon documentation of that finding in the Ecological Risk TM.

3.1.7. Treatability Studies and Pilot Testing

The Work Plan shall include provisions for treatability studies and pilot testing. Respondent(s) shall submit plans for all proposed testing to EPA and the State and obtain approval prior to conducting the corresponding field work. The results of any treatability studies or pilot tests shall be included in the screening of remedial alternatives described below.

3.1.8. Remedial Alternatives Development and Screening

The Work Plan shall include provisions for the preparation and submittal to EPA of a TM that: i) identifies remedial action objectives to protect human health and the environment by eliminating, reducing, or otherwise controlling risks posed by contamination in the Study Area; ii) identifies a range of remedial actions including engineering controls and any institutional controls (ICs) needed to address the risks; and iii) provides the results of an initial screening of alternatives to reduce the number of potential remedies for the final detailed evaluation.

3.1.9. Detailed Evaluation of Remedial Alternatives

The Work Plan shall include provisions for the preparation and submittal to EPA of a TM that presents a detailed evaluation of remedial alternatives that pass the initial screening based on the nine evaluation criteria specified in 40 CFR 300.430[e][9]. The submittal shall also evaluate any ICs identified as a component of the remedial alternatives. The evaluation shall (1) state the objectives of the ICs; (2) determine the specific types of ICs to be used to meet the remedial action objectives; (3) determine when the ICs need to be implemented and for what duration; (4) discuss and document any prior or necessary agreements and with whom (e.g., state and/or local government entities, local landowners, conservation organizations, Respondent(s)) for securing, maintaining and enforcing the ICs.

3.1.10. Applicable or Relevant and Appropriate Requirements

The Work Plan shall include provisions for the preparation and submittal to EPA of a ARARs TM that describes potentially applicable or relevant and appropriate requirements (ARARs) under federal or state law and any proposed ARARs waivers, as required in CERCLA section 121(d). ARARs are environmental regulations, standards, criteria, or limitations, promulgated under federal or more-stringent state laws, for consideration for each remedial alternative being evaluated. Each ARAR evaluated shall be designated as “applicable” or “relevant and appropriate” and linked to the specific remedial activity being evaluated. The ARARs TM shall consider action-specific, chemical-specific, and location-specific ARARs as well as To Be Considered (TBC) criteria, including advisories or guidance that are not promulgated or independently enforceable but which may be used to set protective cleanup levels.

3.1.11. RI and FS Reports

The Work Plan shall include provisions for submittal to EPA and the State a draft RI Report and draft FS Report. The RI and FS Reports collectively shall provide, summarize, and discuss the following:

- Study Area background and setting;
- Sources, nature and extent of groundwater contamination;
- Results of groundwater modeling conducted in support of the RI/FS;
- Baseline human health and ecological risk assessments;
- Data quality and usability;
- Remedial action objectives;
- ARARs;
- The identification and screening of remedial alternatives, including pilot testing;
- A detailed analysis of remedial alternatives, including an evaluation of ICs;
- The roles and responsibilities of water utilities or other third parties required for implementation of each remedial alternative;

- Existing facilities (e.g., groundwater extraction wells, water treatment systems, pipelines) that may be used as part of a remedy, including their planned use, condition, expected life and the potential for increased maintenance or reduced lifespan compared to new facilities.

Upon review of the draft documents, EPA may require the Respondent(s) to revise the RI and FS Reports. When complete, the RI and FS reports, along with an Administrative Record, may provide the basis for a Proposed Plan and Record of Decision to be prepared by EPA in accordance with CERCLA Sections 113(k) and 117(a).

3.1.12. Need for Response Actions at Source Areas

The Work Plan shall include provisions for an evaluation of the need for a response action to remediate source areas, and submittal of a written report describing the results of the evaluation. The evaluation should examine potential human health and ecological health risks from direct contact with contaminated soils, vapor intrusion and any other relevant pathways, ARARs, and provide sufficient detail to support an EPA determination of the need for a response action. The evaluation of direct contact risk shall consider EPA Regional Screening Levels (RSLs), modified as appropriate for California, and other relevant criteria. The evaluation should also consider the threat that contaminated soils and soil vapor pose to the underlying groundwater, and should include analysis of perched groundwater where it is present. The evaluation should take into consideration the current remediation efforts being overseen by DTSC and RWQCB, and specifically identify any sites that may not currently be adequately addressed. EPA will review the source area report in consultation with the State agencies.

3.1.13. Updated Project Schedule.

The Work Plan shall include a schedule consistent with Attachment 2 of this SOW that provides dates for deliverables and other critical path activities required for the RI/FS. The schedule shall include time for EPA and State review of written deliverables and for meetings with EPA representatives when appropriate.

3.1.14. Roles and Responsibilities of Key Personnel and Organizations.

The Work Plan shall describe the roles and responsibilities of individuals and organizations involved in the RI/FS effort, including contractors and major subcontractors.

3.1.15. Permits, Access, Coordination, and Compliance with Substantive Requirements

The Work Plan shall list all permits, easements, access agreements, and approvals anticipated for implementation of the RI/FS.

3.2. Plans

3.2.1. Sampling and Analysis Plan

In accordance with Section IX of the Settlement Agreement, the Respondent(s) shall prepare one or more Sampling and Analysis Plans (SAPs) for field and laboratory activities required to implement the RI/FS. SAPs are required for sample collection and analysis as well as physical measurements such as groundwater levels, borehole geophysics, aquifer parameters, and geodetic survey data.

Any SAP submitted pursuant to this SOW shall consist of a Field Sampling Plan (FSP) and a Quality Assurance Project Plan (QAPP), as described in EPA guidance, including, without limitation, “EPA Guidance for Quality Assurance Project Plans (QA/G-5)” (EPA/600/R-02/009, December 2002 or subsequently issued guidance), and “EPA Requirements for Quality Assurance Project Plans (QA/R-5)” (EPA 240/B-01/003, March 2001 or subsequently issued guidance). Key guidance documents are listed in Attachment 3. The plans shall include, or be accompanied by, a schedule for implementation of the planned sampling, analysis, and reporting activities. The FSP and QAPP may be submitted separately or as one document. Upon EPA approval of a SAP, the Respondent(s) shall implement the activities described therein.

a. The FSP shall describe sampling and data gathering objectives; planned uses of the data; sampling and data collection methods; sample locations and frequencies; sampling equipment and equipment decontamination procedures; sample preservation, packing, labeling, and shipment procedures; chain-of-custody procedures; numbers and types of samples (including quality control [QC] samples); use and maintenance of field logs; and management of investigation-derived wastes. For groundwater wells, the FSP shall also describe well construction and well development procedures.

The FSP shall be written so that a field sampling team unfamiliar with the project would be able to gather the samples and field information required. The FSP shall include a schedule that describes activities that must be completed in advance of sampling, including access agreements and arrangements for disposal of investigation-derived waste. The FSP shall include provisions for the collection of split samples by EPA.

b. The QAPP shall describe the project objectives and organization, functional activities, data quality objectives (DQOs), and quality assurance and quality control (QA/QC) protocols that will be used to achieve the DQOs. In addition, the QAPP shall address personnel qualifications, sampling procedures, sample custody, analytical procedures, document control procedures, preservation of records (in accordance with Section XIV of the Settlement Agreement), and procedures that will be used to enter, store, manage, correct, manipulate,

review, validate, transfer, and analyze data, and ensure that reported data are accurate and defensible.

Respondent(s) shall be prepared to demonstrate to EPA's satisfaction that each laboratory it may use is qualified to conduct the proposed work. This includes use of methods and analytical protocols for the chemicals of concern, in the media of interest, at detection and quantification limits consistent with DQOs and requirements specified in the approved QAPP for the work. Respondent(s) shall only use laboratories that have documented Quality Assurance Programs that comply with ANSI/ASQ E4-1994, "Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs," (American National Standard, January 5, 1995) and "*EPA Requirements for Quality Management Plans (QA/R-2)*," EPA/240/B-01/002, March 2001, or equivalent documentation as determined by EPA. EPA may consider laboratories accredited under the National Environmental Laboratory Accreditation Program ("NELAP") as meeting the Quality System requirements. If the laboratory is not in the EPA Contract Laboratory Program ("CLP"), Respondent(s) shall submit for EPA review and approval, if EPA requests, a laboratory QA program plan. EPA may require that the Respondent(s) submit detailed information to demonstrate that the laboratory is qualified to conduct the work, including information on personnel qualifications, equipment, and material specifications.

Respondent(s) shall submit analytical data and well construction information to EPA and the State in accordance with the schedule included in Attachment 2.

3.2.2. Health and Safety Plan

Respondent(s) shall prepare a Health and Safety Plan (HSP) in accordance with EPA's Standard Operating Safety Guide (PUB 9285.1-03, PB 92-963414, June 1992 or subsequently issued guidance). The HSP shall comply with all currently applicable Occupational Safety and Health Administration (OSHA) regulations found at 29 C.F.R. Part 1910, as well as any related requirements specific to California. EPA will review but neither approve nor disapprove the HSP. The Respondent(s) shall consider all changes to the plan recommended by EPA and shall implement the plan while conducting the RI/FS.

3.3. RI Field Work

Respondent(s) shall conduct RI field work in accordance with any approved SAPs and the HSP. The Respondent(s) shall notify EPA at least two weeks in advance of any field effort.

3.4. Groundwater Flow Modeling Plan

Respondent(s) shall submit a Groundwater Flow Modeling Plan in accordance with the approved Work Plan.

3.5. Groundwater Flow Modeling

Respondent(s) shall conduct groundwater flow modeling in accordance with the approved Work Plan and approved Groundwater Flow Modeling Plan.

3.6. Groundwater Flow Modeling Report

Respondent(s) shall submit a Groundwater Flow Modeling Report in accordance with the approved Work Plan and Groundwater Flow Modeling Plan.

3.7. Remedial Investigation Report

Respondent(s) shall submit to EPA for review and approval a draft RI Report in accordance with the approved Work Plan, followed by a final RI Report incorporating any revisions required by EPA.

3.8. Remedial Alternatives Screening TM

Respondent(s) shall submit a Remedial Alternatives Screening TM documenting the results of the screening of remedial alternatives in accordance with the approved Work Plan. This effort may include pilot testing as discussed in section 3.1.7.

3.9. Remedial Alternatives Evaluation TM

Respondent(s) shall submit a Remedial Alternatives Evaluation TM documenting the results of the evaluation of remedial alternatives in accordance with the approved Work Plan.

3.10. ARARs TM

Respondent(s) shall submit a TM identifying ARARs in accordance with the approved Work Plan.

3.11. Risk Assessment TM

Respondent(s) shall submit one or more Risk Assessment TMs documenting the results of the baseline human health and ecological risk assessments in accordance with the approved Work Plan.

3.12. FS Report

Respondent(s) shall submit a draft FS Report in accordance with the approved Work Plan and a final FS Report incorporating revisions required by EPA.

3.13. Community Involvement Activities

Respondent(s) shall implement any community involvement activities specified in the approved Work Plan or that EPA directs the Respondent(s) to complete. EPA expects to take the lead role in implementing community involvement activities for the Study Area but may request that the Respondent(s) assist EPA by participating in public meetings, preparing fact sheets, placing documents in the local information repository, placing announcements in local newspapers, providing translation services, or conducting other community involvement activities.

Attachment 1 to the SOW: Data Gaps Technical Memorandum

DRAFT



Technical Memorandum

Date: Friday, December 04, 2015

Project: Orange County North Basin Project
HDR Project No. 228-260437

To: Stan Wallace

From: Charlie O'Neill, P.G.

Subject: Final Data Gaps Technical Memorandum

Background

EA Engineering, Science, and Technology, Inc. (EA) was retained by the United States Environmental Protection Agency (U.S. EPA) to assess the magnitude and extent of groundwater contamination in the northern portion of the Orange County Groundwater Basin (North Basin). HDR is a subcontractor to EA. Shallow groundwater contamination by volatile organic compounds (VOCs) has resulted from historical industrial activities in the area. Due to downward migration of shallow contaminated groundwater, deeper aquifers used for water supply have also been impacted. However the magnitude and extent of VOCs are subject to interpretation. For the purpose of this assessment, the VOCs considered were tetrachloroethene (PCE), trichloroethene (TCE), 1,1-dichloroethylene (1,1-DCE), and 1,4-dioxane. The project boundary and release sites referenced herein are shown on **Figure 1**.

The U.S. EPA tasked EA with the following:

- 1) Assess the lateral and vertical extent of groundwater contamination,
- 2) Derive a list of contaminants that exceed regulatory standards (maximum contaminant levels [MCLs] or public health goals [PHGs]),
- 3) Determine the highest concentrations of contaminants in groundwater, and
- 4) Prepare a list of data gaps required to generate a better more complete understanding of the magnitude and extent of groundwater contamination in the North Basin.

This Technical Memorandum updates and supercedes the *Updated Draft Data Gaps Technical Memorandum* dated October 23, 2015. Significant revisions include updates to the plume graphics and closure of data gaps.

Data reviewed consisted of investigative reports, groundwater analytical results from monitoring wells, drinking water supply wells, and from one-time sampling events. The investigative reports, well construction details, and groundwater analytical results were compiled from the State of California GeoTracker and EnviroStor websites, and from the Orange County Water District. Key assumptions included a westerly to southwesterly groundwater flow and two aquifers: the Shallow Aquifer which extends from the first water to 200 feet below ground surface (ft bgs), and the Principal Aquifer which extends from 200 ft bgs to the maximum depth

explored. The North Basin can be divided into an area of highly permeable sands and gravels with intermittent and discontinuous clay and silt deposits in the east portion of the basin and an area of aquifers that are hydraulically separated by lower-permeability aquitards in the western portion of the basin. Although isolated perched aquifers may be present in the eastern portion of the basin, these areas are considered part of the Shallow Aquifer for this Technical Memorandum.

Data was imported to a Geographical Information System (GIS) and spatially assessed to determine the magnitude and extent of groundwater impact in the North Basin. The assessment relied primarily upon maximum groundwater analytical results from samples collected from 2010 through 2015. Concentration trends within this time frame were qualitatively assessed and considered as part of the determination of the presence of groundwater contamination. For example, if high contaminant concentrations were reported in 2010 but showed lower concentrations for each subsequent year, then the lower concentration values were used. Groundwater quality from wells with screen intervals greater than 50 ft in length was not considered.

Groundwater quality in the Shallow Aquifer is generally defined by high concentration of wells in discrete locations adjacent to a release site. Groundwater quality in the Principal Aquifer is generally defined by widely spaced wells and by wells with long (>50 ft.) screen intervals.

To better assess the magnitude and extent of VOC impacts in the Shallow Aquifer, the EA Team recommends new wells as listed in **Table 1**. **Table 1** presents the recommended location, a target depth range for the screen intervals, including the basis for the recommended well location with a list of nearby wells that provided supporting information. Recommended well locations and VOC plumes in the Shallow Aquifer are shown on **Figure 2**.

Table 1. Recommended Shallow Aquifer Well Locations, North Basin

Well No.	Priority	Location	Depth (feet)	Basis / Rationale
1	Low	Fender Avenue south of Wallace Ave	150 – 170	Shallow cross gradient monitoring north of 50x MCL plume. Between Aerojet and residential property. Potential grab sample location in lieu of a monitoring well.
2	Low	Fender Avenue south of Mission Dr	150 – 170	Shallow cross gradient monitoring north of 50x MCL plume. Between Aerojet and residential property. Potential grab sample location in lieu of a monitoring well.
3	High	E. Orangethorpe Ave at S. Acacia Ave - NE	100 – 120	Grab samples indicate concentrations 10x MCL, no nearby wells. Multiple release sites. Detection of PCE, TCE and 1,1-DCE.
4	High	E. Orangethorpe Ave at S. Acacia Ave - SE	100 – 120	Grab samples indicate concentrations 10x MCL, no nearby wells. Multiple release sites. Detection of PCE, TCE and 1,1-DCE.
5	High	E. Orangethorpe Ave at S. Acacia Ave – (west of S. Acacia Ave)	100 – 120	Grab samples indicate concentrations 10x MCL, no nearby wells. Multiple release sites. Detection of PCE, TCE and 1,1-DCE.
6	Medium	E. Walnut Avenue & S. Raymond Avenue	100 – 120	Shallow cross gradient monitoring north of 200x MCL plume. Adjacent to CMI.
7	Medium	E Valencia Dr. & S. Raymond Ave (CMI)	100 – 120	Co-located with new Principal aquifer well. Adjacent to CMI.
8	High	E. Walnut Avenue & S. Cornell Ave	100 – 120	Shallow down gradient monitoring west of 200x MCL plume. Adjacent to CMI.
9	High	Lemon Via	100 – 120	Shallow down gradient monitoring west of 200x MCL plume. Adjacent to Kester Solder.
10	High	E. Orangethorpe south of Lemon Via	100 – 120	Shallow down gradient monitoring west of 200x MCL plume. Adjacent to Kester Solder.
11	Medium	E Commercial at N Olive St	100 – 120	Shallow down gradient monitoring south of 10x MCL plume.
12	Medium	N Anaheim Blvd at E Commercial	100 – 120	Shallow down gradient monitoring south of 10x MCL plume.
13	Medium	W. Truslow at S. Richmond Ave	100 – 120	Shallow cross gradient monitoring south of VOC plume. Adjacent to Fullerton Mfg.
14	Medium	S. Richmond Ave at W Walnut Ave	100 – 120	Shallow cross gradient monitoring north of VOC plume. Adjacent to Fullerton Mfg.
15	Medium	W. Truslow near S. Richmond Ave (Fullerton Mfg.)	100 – 120	Shallow cross gradient monitoring south of VOC plume. At Fullerton Mfg. Co-located with Principal Aquifer well.
16	High	W Valencia Dr south of Chestnut Pl	100 – 120	Shallow down gradient monitoring of VOC plume. Adjacent to Fullerton Mfg.

To better assess the magnitude and extent of VOC contamination in the Principal Aquifer, the EA Team recommends new wells as listed in **Table 2**. **Table 2** presents the recommended location, a target depth range for the screen intervals, including the basis for the recommended

well location with a list of nearby wells that provided supporting information. Recommended well locations and VOC plumes in the Principal Aquifer are shown on **Figure 3**.

Table 2. Recommended Principal Aquifer Well Locations, North Basin

Well No.	Priority	Recommended Location	Depth	Basis / Rationale
1	High	E Walnut Ave & S Acaia Ave	Principal Aquifer 200 – 300 ft bgs multiple intervals	Northern boundary PCE monitoring. Multiple release sites. Poor depth resolution. FM-9.
2	Medium	E Orangethorpe Ave & S Acacia Ave	Principal Aquifer 200 – 300 ft bgs multiple intervals	Southern boundary PCE plume monitoring. Multiple release sites. Poor depth resolution. In place of a new well, utilize well ACP-P03 for depth discrete monitoring across 110 ft screen interval.
3	Medium	E. Orangethorpe Ave & Manhattan Ave (Y19)	Principal Aquifer 200 – 300 ft bgs multiple intervals	Southern boundary PCE plume monitoring. Poor depth resolution. FM-10, FM-12. In place of a new well, utilize well ACP-P03 for depth discrete monitoring across 110 ft screen interval.
4	High	E Valencia Dr. & S. Raymond Ave (CMI)	Principal Aquifer 250 – 300 ft bgs multiple intervals	Northern boundary PCE plume monitoring & co-mingling boundary with TCE plume. Multiple release sites. Poor depth resolution. FM-12.
5	Low	E Rosslynn Ave & S Lawrence Ave	Principal Aquifer 200 – 300 ft bgs multiple intervals	Interior TCE & plume extent to assess east / west connectedness. FM10, FM-11, FM-12, FM-23.
6	High	E Orangethorpe Ave & N Missile.	Principal Aquifer 200 – 300 ft bgs multiple intervals	Interior TCE & plume extent to assess east / west connectedness. FM10, FM-11, FM-12, FM-23.
7	High	W. Truslow & S. Richmond Ave (Fullerton Mfg.)	Principal Aquifer 220 – 300 ft bgs, multiple intervals	Northern boundary TCE plume monitoring at Fullerton Mfg. FM-18, FM-19B, FM-20.
8	Low	N. West St. & W. Romneya Dr.	Principal Aquifer 200 – 215, 270 – 305 ft bgs, multiple intervals	Interior TCE plume monitoring to assess lateral extent of Metro Center and W. La Palma plumes. AMD-4, CB-1, FM-1, AM-31, FM-24.
9	Medium	W Roberta Ave & S Lombard Dr.	Principal Aquifer 200 – 215, 240 – 305 ft bgs, multiple intervals	Interior monitoring for 1,4-Dioxane, PCE & TCE plumes. AMD-4, CB-1, FM-1, AM-31, FM-24, FM-22.
10	High	W Orangethorpe Ave & S Jefferson Ave	Principal Aquifer 200 – 215, 240 – 305 365 – 385 ft bgs, multiple intervals	Lateral & vertical extent of TCE plume. FM-22, FM19C.
11	Low	N. Euclid & W. Romneya Dr.	Principal Aquifer 200 – 215, 270 – 305 ft bgs, multiple intervals	Interior TCE plume monitoring to assess lateral extent of Metro Center and W. La Palma plumes. AMD-4, CB-1, FM-1, AM-31, FM-24.
12	Medium	N. Euclid & W. Crescent Ave	Principal Aquifer 200 – 215, 270 – 305 ft bgs, multiple intervals	Downgradient TCE plume monitoring. AMD-4, CB-1, FM-1, AM-31, FM-24. No downgradient monitoring point at this location.

Table 3 presents the maximum concentrations of 1,1-DCE, 1,4-Dioxane, PCE and TCE detected in groundwater, in the North Basin from 2010 – 2015. The data was extracted from the State of California GeoTracker database. Sites from where the maximum detections were reported are shown on **Figure 1**.

Table 3. Maximum Detections of 1, 1-DCE, 1,4-Dioxane, PCE and TCE in Groundwater, North Basin

Analyte	Year	Value (µg/L)	Site Name
1,1-DCE	2010	180	CALCOMP
1,1-DCE	2011	160	CALCOMP
1,1-DCE	2012	84	CALCOMP
1,1-DCE	2013	1,300	Chicago Musical Instruments
1,1-DCE	2014	1,700	Chicago Musical Instruments
1,4-Dioxane	2010	1,100	CALCOMP
1,4-Dioxane	2011	1,000	CALCOMP
1,4-Dioxane	2012	650	Circle Seal Controls
1,4-Dioxane	2013	1,500	CALCOMP
1,4-Dioxane	2014	660	CALCOMP
PCE	2010	2,200	Northrop Grumman / Kester Solder
PCE	2011	1,900	Northrop Grumman / Kester Solder
PCE	2012	1,900	Northrop Grumman / Kester Solder
PCE	2013	1,900	Northrop Grumman / Kester Solder
PCE	2014	3,300	Chicago Musical Instruments
TCE	2010	3,300	Hughes Aircraft Company
TCE	2011	21,000	Hughes Aircraft Company
TCE	2012	23,000	Hughes Aircraft Company
TCE	2013	1,500	Northrop Grumman (Y-12)
TCE	2014	14,000	Hughes Aircraft Company

Vapor Intrusion Assessment

Due to the potential for volatilization of relatively high concentrations of TCE and PCE from groundwater to indoor air, seven areas with the North Basin were identified for vapor intrusion assessment. The locations were identified solely on concentration of constituents in groundwater. Areas recommended for vapor intrusion assessment are listed in **Table 4** and shown on **Figure 4**.

Table 4. Areas Recommended for Vapor Intrusion Assessment, North Basin

Area	Analyte	Groundwater Concentration	Land Use
1	TCE and PCE	2014 TCE & PCE up to 100 µg/L	Commercial
2	TCE and PCE	2014 TCE & PCE up to 1,000 µg/L	Commercial and Residential
3	TCE and PCE	2014 TCE up to 500 µg/L & PCE up to 1,000 µg/L	Commercial
4	TCE and PCE	2014 TCE up to 500 µg/L & PCE up to 25 µg/L	Commercial and Residential
5	TCE	2000 TCE up to 6,500 µg/L	Commercial and Residential
6	TCE	2014 TCE up to 500 µg/L	Commercial and Residential
7	TCE and PCE	2014 TCE & PCE up to 1,000 µg/L	Commercial

Outstanding Data

The Fullerton Manufacturing site was identified in the State of California databases as a contaminant release site. Data from this site (see **Figure 1**) is not available and therefore has not been incorporated into the GIS and ground water plumes developed as part of this assessment.

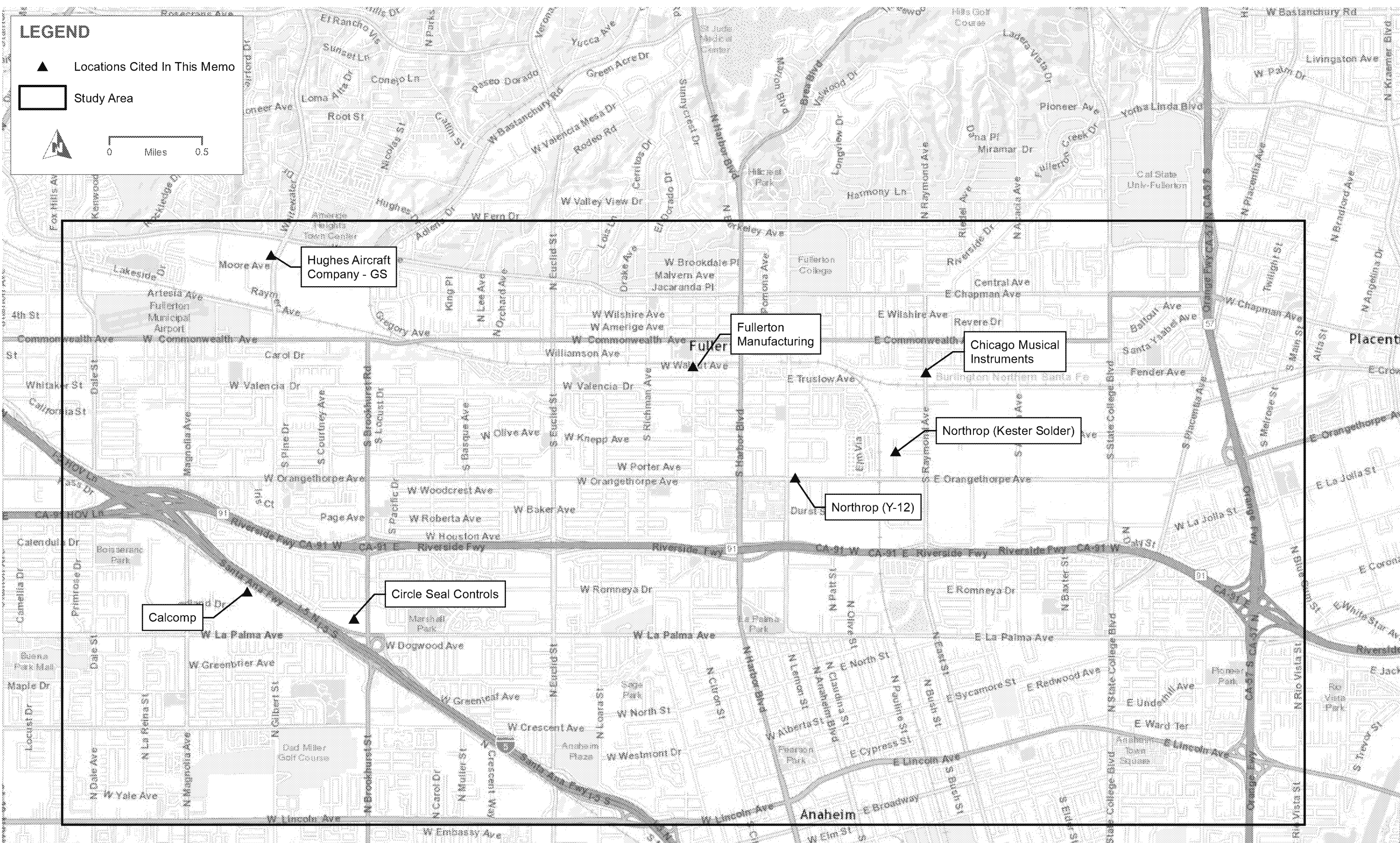
Attachments:

Figure 1 – Study Area

Figure 2 – Recommended Well Locations, Shallow Aquifer


Figure 3 – Recommended Well Locations, Principal Aquifer

Figure 4 – Areas Recommended for Vapor Intrusion Assessment

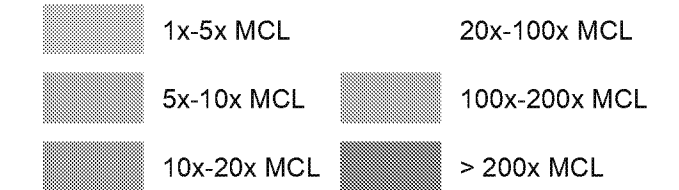


State / Federal MCL: PCE – 5 / 5 µg/L, TCE – 5 / 5 µg/L, 1,1-DCE – 6 / 7 µg/L | Principal Aquifer: > 200 ft bgs
VOC Data: 2010 - 2014

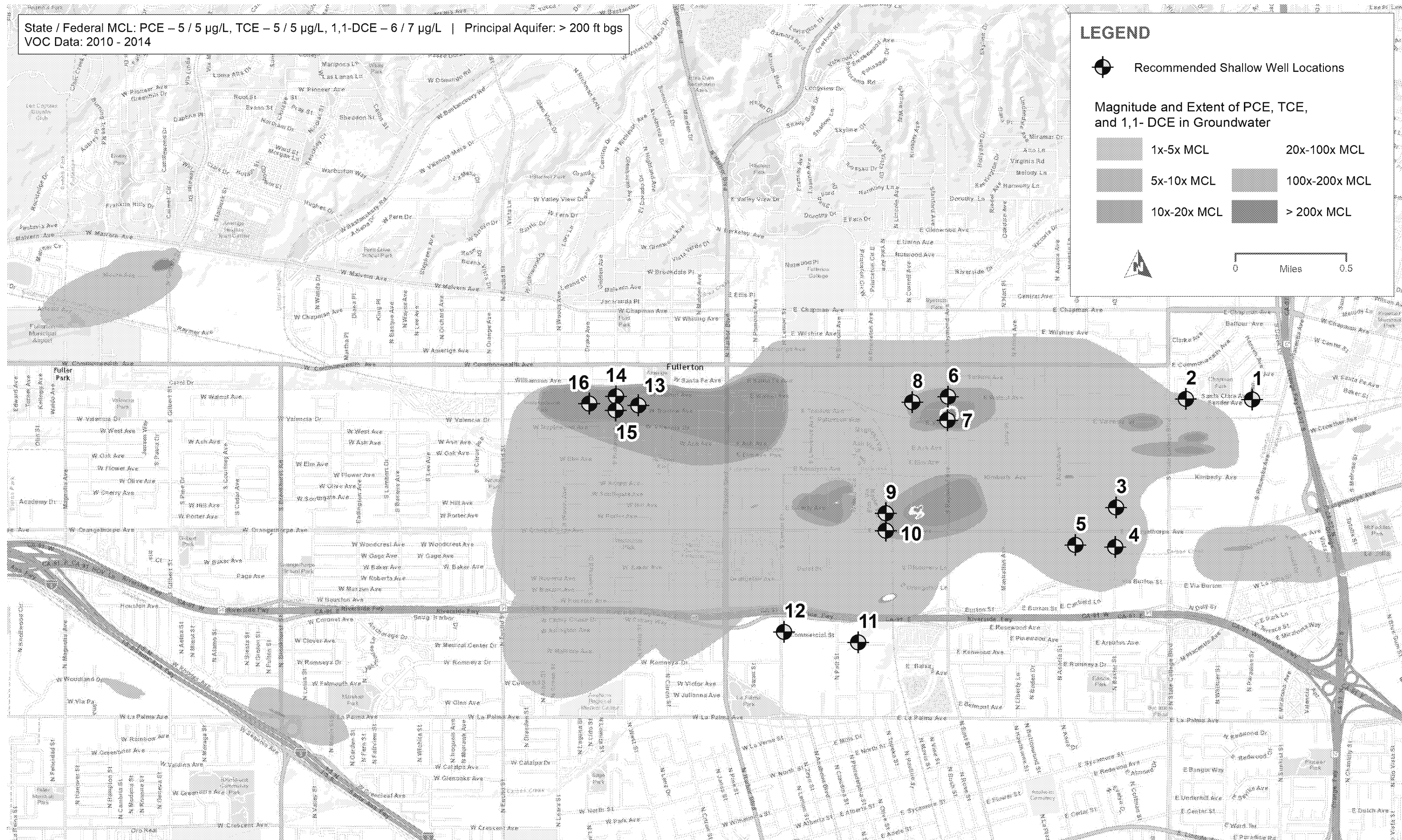
LEGEND

 Recommended Shallow Well Locations

Magnitude and Extent of PCE, TCE,
and 1,1- DCE in Groundwater



0 Miles 0.5



ORANGE COUNTY NORTH BASIN
RECOMMENDED SHALLOW WELL LOCATIONS

FIGURE 2



State / Federal MCL: PCE – 5 / 5 µg/L, TCE – 5 / 5 µg/L, 1,1-DCE – 6 / 7 µg/L | Principal Aquifer: > 200 ft bgs
VOC Data: 2010 - 2014

LEGEND



Recommended Principal Well Locations

Magnitude and Extent of PCE, TCE,
and 1,1- DCE in Groundwater

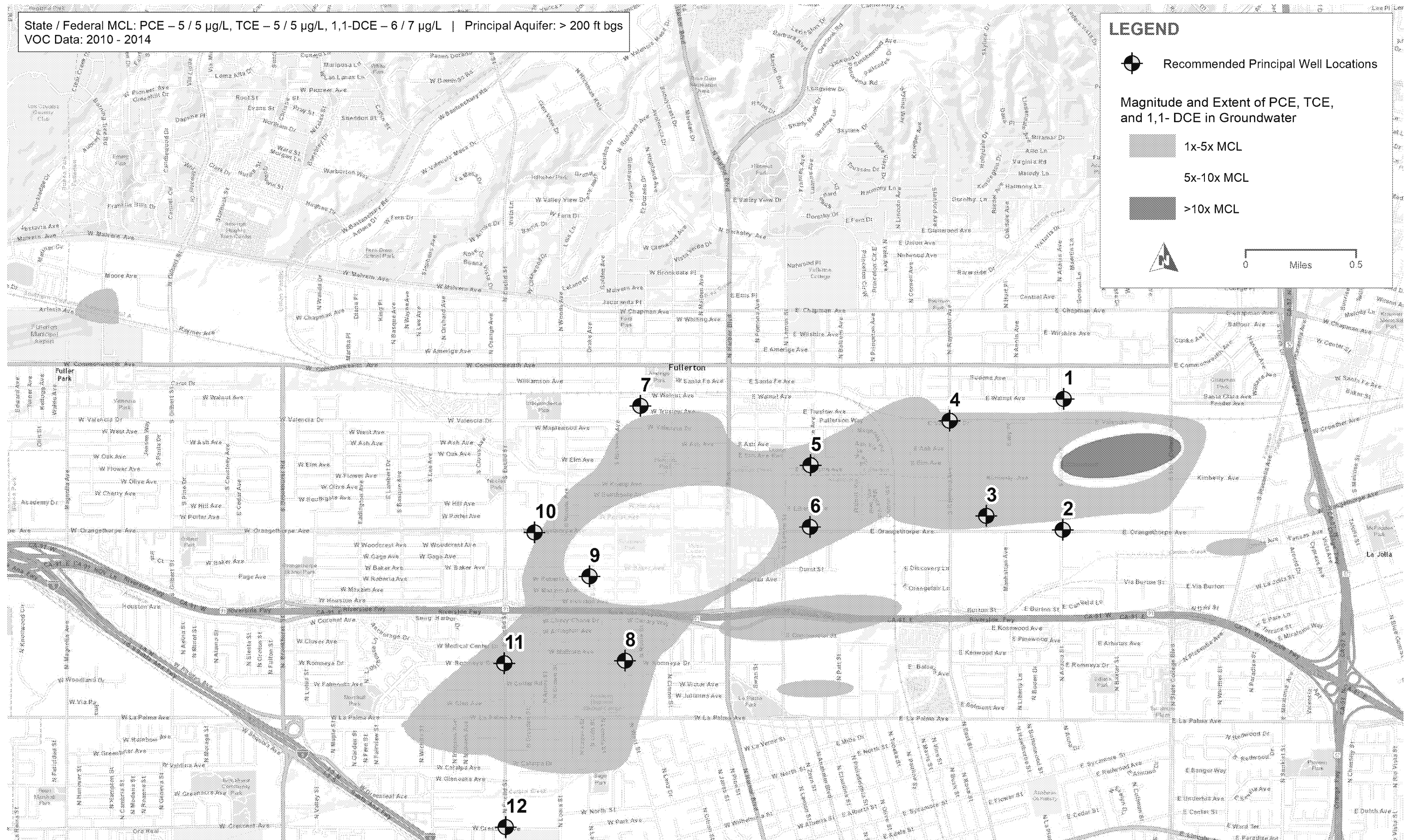
1x-5x MCL

5x-10x MCL

>10x MCL



0 Miles 0.5



ORANGE COUNTY NORTH BASIN
RECOMMENDED PRINCIPAL WELL LOCATIONS

FIGURE 3



Attachment 2 to the SOW. Due Dates for Major Deliverables and Other Activities

Ref SOW Section	Ref Settlement Agreement Section	Activity or Deliverable	Due ^{1, 2, 3, 4}
-	-	Effective Date of Settlement Agreement	
1.2	VIII	Notification of Personnel to be used for the Work, including submittal of QMP	Fourteen (14) days after the Effective Date of the Settlement Agreement
-	VIII	Notification of Project Coordinator	Fourteen (14) days after the Effective Date of the Settlement Agreement
-	XXV	Proof of commercial general liability and automobile liability insurance	Thirty (30) days before commencing any onsite Work
1.3	IX	Monthly Progress Reports	15 th day of the following month
1.3	IX	Meeting Notes	5 days after any meeting where critical decisions are made or per EPA/State request.
-	IX	Notification of Releases from the Site	Immediate notification and submittal of a written report within seven (7) days after each release
3.1	IX	RI/FS Work Plan	Forty-five (45) days after the Effective Date of the Settlement Agreement
3.3	IX	EPA notification of planned field work	Two weeks before field effort begins
3.2	IX	SAP and HSP for RI fieldwork	Forty-five (45) days after the Effective Date of the Settlement Agreement
3.3	IX	RI fieldwork	As specified in approved SAP
3.7	IX	Interim RI Reports	As specified in approved Work Plan
3.4	IX	Groundwater Flow Modeling Plan	As specified in approved Work Plan
3.5	IX	Groundwater Flow Modeling	As specified in approved Work Plan or approved Groundwater Flow Modeling Plan
3.6	IX	Groundwater Flow Modeling Report	As specified in approved Work Plan or approved Groundwater Flow Modeling Plan
3.11	IX	Risk Assessment TM	As specified in approved Work Plan
3.10	IX	ARARs TM	As specified in approved Work Plan
3.8	IX	Remedial Alternatives Identification and Screening TM	As specified in approved Work Plan

Appendix A to Settlement Agreement and Administrative Order on Consent, Docket #2016-03

Ref SOW Section	Ref Settlement Agreement Section	Activity or Deliverable	Due ^{1, 2, 3, 4}
3.9	IX	Detailed Analysis of Remedial Alternatives TM	As specified in approved Work Plan
3.12	IX	RI/FS Report	As specified in approved Work Plan
3.13	IX	Source Evaluation TM	As specified in approved Work Plan
4	IX	Submittal of analytical data, whether or not validated	Forty-two (42) calendar days of sample shipment to the laboratory or 14 days of receipt of analytical results from the laboratory, whichever occurs first.
4	IX	Submittal of validated analytical data	Ninety (90) calendar days of the sample shipment to the laboratory
4	IX	Groundwater well construction information	Ninety (90) days after completion of a well.

¹ Unless otherwise indicated, all deliverables shall be provided in an electronic format (e.g., PDF) to EPA, EPA's contractor, the RWQCB, and DTSC.

² All deliverables set forth in Attachment 2 will be reviewed and approved by EPA in accordance with Section X of the Settlement Agreement, except for the Health and Safety Plan(s), which will be reviewed but neither approved nor disapproved.

³ Revised versions of documents, if needed, are due 14 days after receipt of EPA comments, unless specified otherwise in the Settlement Agreement, this Attachment, or in writing by EPA.

⁴ Information presented in color must be interpretable when reproduced in black and white.

⁵ Estimated time is in calendar days.

Attachment 3 to the SOW. Selected References and Guidance

Ahmed, Rafiq, Cal/EPA Department of Toxic Substances Control. *North Orange County Site Discovery Project*. Cooperative Agreement No. V-97999001-2 with U.S. EPA Region IX. February 2011.

Black, Stewart W., California Department of Toxic Substances Control. *Petition to Conduct a Preliminary Assessment of Hazardous Substance Releases in the North Orange County Basin Groundwater Plume Area*. Letter to Enrique Manzanilla, U.S. EPA Region IX. November 25, 2014.

EA Engineering, Science and Technology, Inc. *Final Data Gap Technical Memorandum, Orange County North Basin non-NPL site*. Contract: EP-S9-14-0, Task Order 007-RSNA-A978, for U.S. EPA Region IX. December 4, 2015.

Interra Geoscience and Engineering Solutions, for Orange County Water District. *Conceptual Model Refinement, North Basin Groundwater Modeling Project*. February 18, 2015.

National Oil and Hazardous Substances Pollution Contingency Plan, Final Rule, Federal Register 40 CFR Part 300, March 8, 1990 and as revised

Guide to Management of Investigation-Derived Wastes, U.S. EPA, Office of Solid Waste and Emergency Response, Publication 9345.3-03FS, January 1992

A Systematic Approach for Evaluation of Capture Zones at Pump and Treat Systems, EPA/600/R-08/003, January 2008

Summary of Key Existing EPA CERCLA Policies for Groundwater Restoration, OSWER Directive 9283.1-33, June 26, 2009

Superfund Green Remediation Strategy, September 2010, available at: <http://www.epa.gov/superfund/greenremediation/sf-gr-strategy.pdf>

CERCLA Compliance with Other Laws Manual, Two Volumes, U.S. EPA, Office of Emergency and Remedial Response, (DRAFT), OSWER Directive No. 9234.1-01 and -02, August 1988

Superfund Community Involvement Handbook, U.S. EPA, Office of Solid Waste and Emergency Response, EPA-540-K-05-003, April 2005

Policy Guidance for Direct Domestic Use of Extremely Impaired Sources, California Department of Public Health Policy Memorandum 97-005

Clarification of the Role of Applicable, or Relevant and Appropriate Requirements in

Appendix A to Settlement Agreement and Administrative Order on Consent, Docket #2016-03

Establishing Preliminary Remediation Goals Under CERCLA, EPA 540/F-97/008, OSWER 9200.4-23, August 1997

EA Engineering, Science and Technology Inc. *Updated Data Gaps Technical Memorandum, Orange County North Basin non-NPL site* (draft). USEPA Region 9 contract EP-S9-14-01, October 2015.

USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, USEPA-540-R-08-01, June 2008, EPA Office of Emergency and Remedial Response (see <http://www.epa.gov/superfund/programs/clp/> for most recent versions).

USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, EPA 540-R-10-011, January 2010 (see <http://www.epa.gov/superfund/programs/clp/> for most recent versions).

EPA Guidance on Systematic Planning Using the Data Quality Objectives Process (QA/G-4), February 2006.

EPA Requirements for Quality Management Plans (QA/R-2), EPA/240/B-01/002, March 2001.

EPA Requirements for Quality Assurance Project Plans (QA/R-5), EPA/240/B-01/003, March 2001.

EPA Region IX Sampling and Analysis Plan Guidance and Template, R9QA/002.1, April 2000.

Manzanilla, Enrique, EPA Region IX. Letter to Barbara A. Lee, California Department of Toxic Substances Control, and Kurt Berchtold, Santa Ana Regional Water Quality Control Board. September 3, 2015.

EPA Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air. OSWER Publication 9200.2-154. June 2015.

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